### **Regression Assignment**

**Objective:** The objective of this assignment is to evaluate your understanding of regression techniques in supervised learning by applying them to a real-world dataset.

**Dataset:**Use the California Housing dataset available in the sklearn library. This dataset contains information about various features of houses in California and their respective median prices.

**Key Components to be Fulfilled:**

1. **Loading and Preprocessing (2 marks):**
   * Load the California Housing dataset using the fetch\_california\_housing function from sklearn.
   * Convert the dataset into a pandas DataFrame for easier handling.
   * Handle missing values (if any) and perform necessary feature scaling (e.g., standardization).
   * Explain the preprocessing steps you performed and justify why they are necessary for this dataset.
2. **Regression Algorithm Implementation (5 marks):** Implement the following regression algorithms:  
   * Linear Regression
   * Decision Tree Regressor
   * Random Forest Regressor
   * Gradient Boosting Regressor
   * Support Vector Regressor (SVR)  
      For each algorithm:
   * Provide a brief explanation of how it works.
   * Explain why it might be suitable for this dataset.
3. **Model Evaluation and Comparison (2 marks):**
   * Evaluate the performance of each algorithm using the following metrics:
     + Mean Squared Error (MSE)
     + Mean Absolute Error (MAE)
     + R-squared Score (R²)
   * Compare the results of all models and identify:
     + The best-performing algorithm with justification.
     + The worst-performing algorithm with reasoning.
4. **Timely Submission (1 mark):**
   * Submit your code in a Jupyter Notebook format via a GitHub link.
   * Ensure that your code is well-documented and explanations are clear and concise.

**Submission Guidelines:**

* Use Python and Jupyter Notebook for implementation.
* Submit the GitHub repository link containing the code and all necessary files.
* Ensure proper documentation, including code comments and markdown explanations.

**Total Score:** 10